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ABSTRACT

A computer-assisted instruction (CAI) curriculum development project is being carried out by the Commonwealth CAI Consortium. Financed by an Elementary Secondary Education Act Title III grant, the project seeks to develop a CAI curriculum in general mathematics and algebra for use in the ninth grades of urban schools. Ninth grade teachers and mathematics educators will design the curriculum so that students in the course will spend half their time on-line; teachers will be trained to act as guides, diagnosticians, and consultants to individual students. Beginning in September of 1969, eight terminals will be placed in each of four classrooms in each of two schools; 16 pupils will use each classroom during each period, so that at peak efficiency the man-machine system will provide instruction for between 500 and 600 students. In addition, adult education and teacher in-service programs will be available in the evenings and on weekends. (Author/PB)

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THE PENNSYLVANIA STATE UNIVERSITY

College of Education

Interim Report

COMMONWEALTH COMPUTER-ASSISTED INSTRUCTION CONSORTIUM

March 16 to July 15, 1968

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Abstract

The Commonwealth CAI Consortium is made up of four organizations: the school districts of Pittsburgh and Philadelphia, the Department of Public Instruction, and The Pennsylvania State University. Effective March 16, 1968, the Consortium was activated by a Title III ESEA grant to the Pittsburgh School District in the amount of $326,636 for a twelve-month period. The three-year mission of the Consortium is to develop and evaluate two individualized mathematics courses for ninth grade pupils in urban schools. The individualized courses are designed around the use of a modern instructional computer by teachers and pupils.

The initial effort of the Consortium is focused on the development of a mathematics curriculum particularly appropriate for ninth grade pupils in urban high schools. This initial curriculum effort is located in the CAI Laboratory at Penn State under the provisions of a $260,556 sub-contract for the first twelve-month period. Instructional representatives with teaching experience in the city high schools of Pittsburgh and Philadelphia are working together with mathematics educators from the University staff to produce this new curriculum. Such an arrangement takes advantage of the knowledge of the student body possessed by city teachers and of the development experience of the University staff in computer-assisted instruction.

A utilization pattern has been planned so that the CAI mathematics effort can be implemented into the city high schools with a minimum of disruption and dislocation. Ordinary sized classrooms are to be used and each high school's system of forty to fifty minute periods is being respected. The regular teachers assigned to the general mathematics and first algebra courses will be responsible for the project classes after a period of training in the new computer-based instructional technology. The present plan calls for the installation of a computer and thirty-two student stations in Schenley High School, Pittsburgh, and in Lincoln High School, Philadelphia. Eight

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Note to accompany the Penn State Documents.

In order to have the entire collection of reports generated by the Computer Assisted Instruction Lab. at Penn State University included in the ERIC archives, the ERIC Clearinghouse on Educational Media and Technology was asked by Penn State to input the material. We are therefore including some documents which may be several years old. Also, so that our bibliographic information will conform with Penn State's, we have occasionally changed the title somewhat, or added information that may not be on the title page. Two of the documents in the CARE (Computer Assisted Remedial Education) collection were transferred to ERIC/IR to abstract. They are Report Number R-36 and Report Number R-50.

Jack McCall, ERIC/IR

stations will be placed in each of four classrooms at each location. In the initial operational year beginning September 1969, each classroom will instruct sixteen pupils during each school period. The role of the teacher in each classroom will be that of guide, diagnostician, and curriculum expert, with considerable time for individual consultations with pupils. The mathematics curriculum for each course is divided into two carefully articulated components, "on-line" (at the computer-connected station) and "off-line" (at individual study carrels). The typical middle-ability student will cover about one-half of his mathematics program in each component, with variations from this norm for students of other ability levels.

Operating at peak efficiency, each man-machine system is expected to provide instruction for five hundred to six hundred pupils, about evenly divided between general mathematics and algebra. In addition, it is planned to use the system to offer courses of instruction to teachers on an in-service basis and to other adults as dictated by need and the availability of tested computer-based programs. Programs for adults will be available during late afternoon, Saturday, and evening hours, and an additional four hundred to five hundred persons per year can be accommodated for one average-sized course.

The following narrative reports the activities of the sub-contract group, located primarily at Penn State, for the period March 16 to July 15, 1968.

Staff

A staff has been drawn together from the school districts of Pittsburgh and Philadelphia and The Pennsylvania State University to work on each course in the project. The efforts of the algebra and general mathematics teams have been supported and coordinated by Mr. Robert Igo, who is an Ed. D. candidate in the College of Education. Professor Alan Riedesel, Professor Ralph Heimer, and Dr. Francis Mueller have been serving in the capacity of curriculum advisers to the team members. Miss Catherine Folger represents Pittsburgh and Mr. Warner Johnson represents Philadelphia on the algebra team. Their prime responsibility is in the selection and determination of content and instructional strategy to be employed in the algebra course. They are supported by a full-time programer, Mrs. Deanne Bretschneider, and two half-time graduate assistants in mathematics education, Miss Peggy Behrendt and Mr. John McNear. The general matehmatics team is composed of Mr. Roland Lazzaro from Pittsburgh and Mr. William Collins of Philadelphia. They are supported by a full-time programer, Mr. Joseph Thomas for the summer term, and

Miss Karen Braddock for the remainder of the project. Additional support is provided to this team by Miss Cathy Procik and Mr. Robert Hostetler, who are graduate assistants in mathematics and mathematics education.

Both areas, algebra and general mathematics, are also supported by Miss Rosemary Pecci, an educational programer, and Mrs. Leslye Bloom, a half-time graphic artist. Systems modifications and system function applications are the responsibility of three half-time graduate assistants, Messrs. Vernon Dibeler, Harry Maurer, and David Mathias.

In addition to the professional staff working on the project, there is a staff of one secretary, three full-time technicians, and one part-time technician for clerical work and for inputting curriculum material on the system.

Curriculum Development

The main function of the on-line material will be to present to students instruction in Algebra I and General Mathematics. A record will be kept of the student's interaction with the program via the computer. According to the student's progress, extensive remediation, drill, or enrichment materials will be provided to him for off-line activities. The curriculum teams for Algebra I and General Mathematics are responsible for developing the instructional content of the CAI program as well as the off-line material.

Initially, at least, the authors of the algebra course have divided the main topics between them. For each topic, the author has identified behavioral objectives and, individually, is preparing material to meet those objectives. The authors of the general mathematics course, on the other hand, are testing a different work arrangement. Along with a consultant, they are developing their materials together, as a team. On the basis of further experiences, these productive arrangements may be modified later in the year.

Training Activities

During the past four months, considerable time has been spent by the Laboratory staff in training Consortium personnel in the use of the author language for course materials. At this writing, most members of the two curriculum teams have a good command of the intricacies of Coursewriter II, as the author language is called.

A proposal to the U. S. Office of Education under the provisions of the Education Professions Development Act was prepared by Professor Reidesel and submitted through University channels prior to a June first deadline. This proposal, if funded, will provide the resources for a special three-week workshop in the summer of 1969 for twelve mathematics teachers from each city who will supervise the CAI program.

Facilities

For purposes of curriculum development, the Consortium is currently using approximately fifty per-cent of Penn State's ten-station CAI system. School plant authorities in Pittsburgh and Philadelphia have obtained specifications and systems requirements for the remodeling of four classrooms and a computer room in each high school. Professors Mitzel and Hall have made several site visits and participated in the choice of project locations. Present planning is for locations in Schenley High, Pittsburgh, and Lincoln High, Philadelphia.

Schedule

The following schedule of target dates is planned for the three-year effort:

January 31, 1969:	Completion of first rough draft of two mathematics courses
February 15, 1969:	Installation of IBM 1500 systems with eight student stations in Schenley and Lincoln High Schools
June 30, 1969:	Completion of course revisions and informal testing with ninth grade students
July 1-31, 1969:	Execution of formal field trial with each course in each location (summer school students)
August 1-31, 1969:	Three-week workshop for twenty-four participating teachers Installation of twenty-four additional student stations in each location
September 8, 1969:	Begin formal CAI mathematics education program in urban schools